FIG. 1

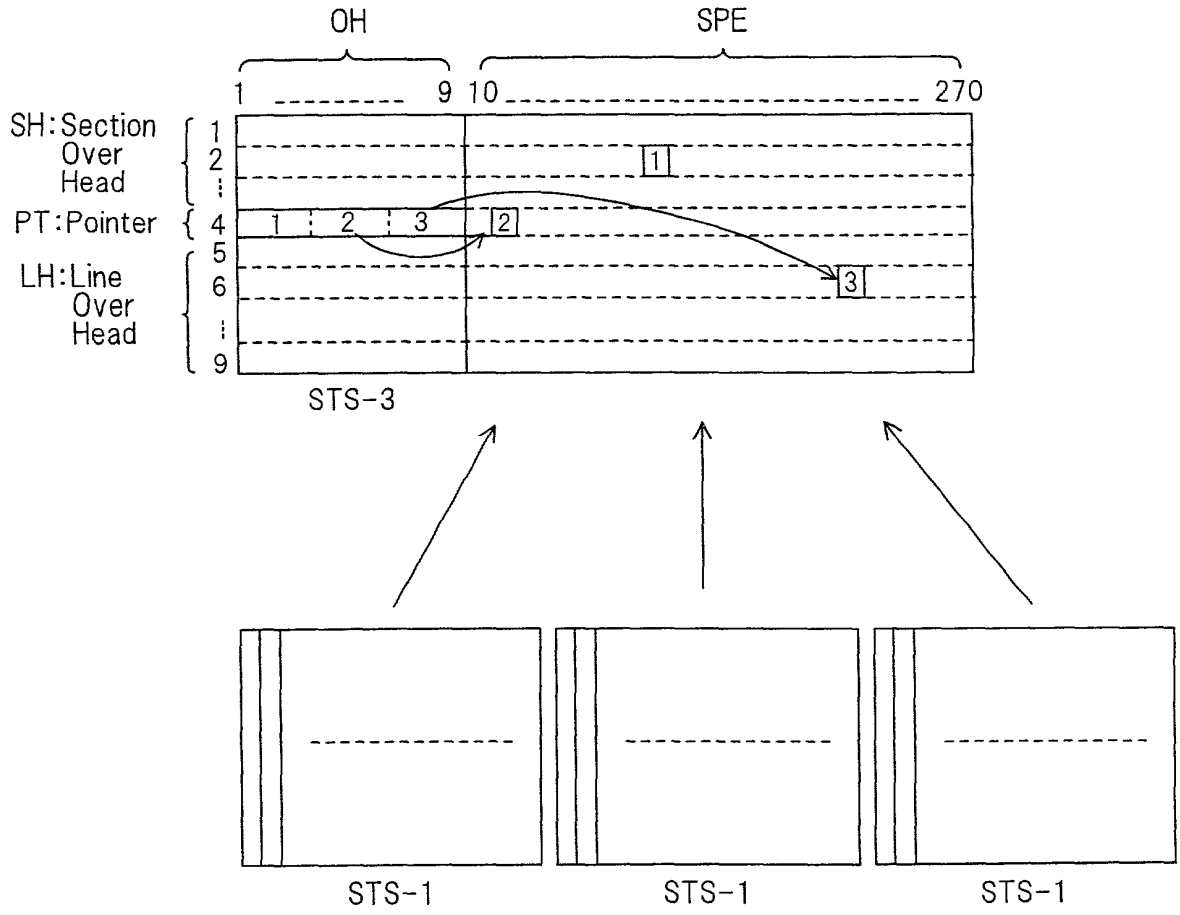
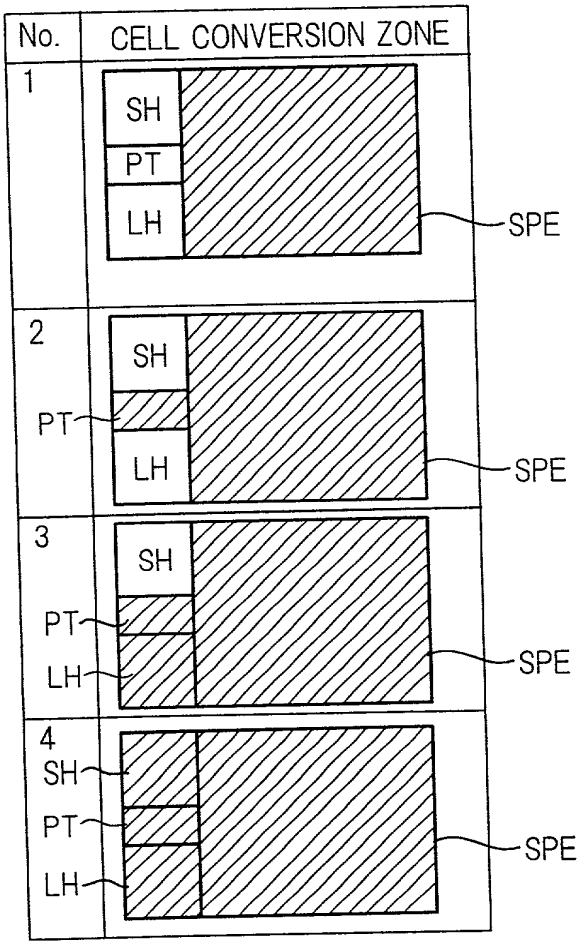

OH
SPE
1
9
10
270
SH:Section Over Head
PT:Pointer
LH:Line Over Head
1
2
3
4
5
6
9
1
2
3
STS-3
STS-1
STS-1
STS-1

FIG. 2



JP2006001760A 060105

FIG. 3

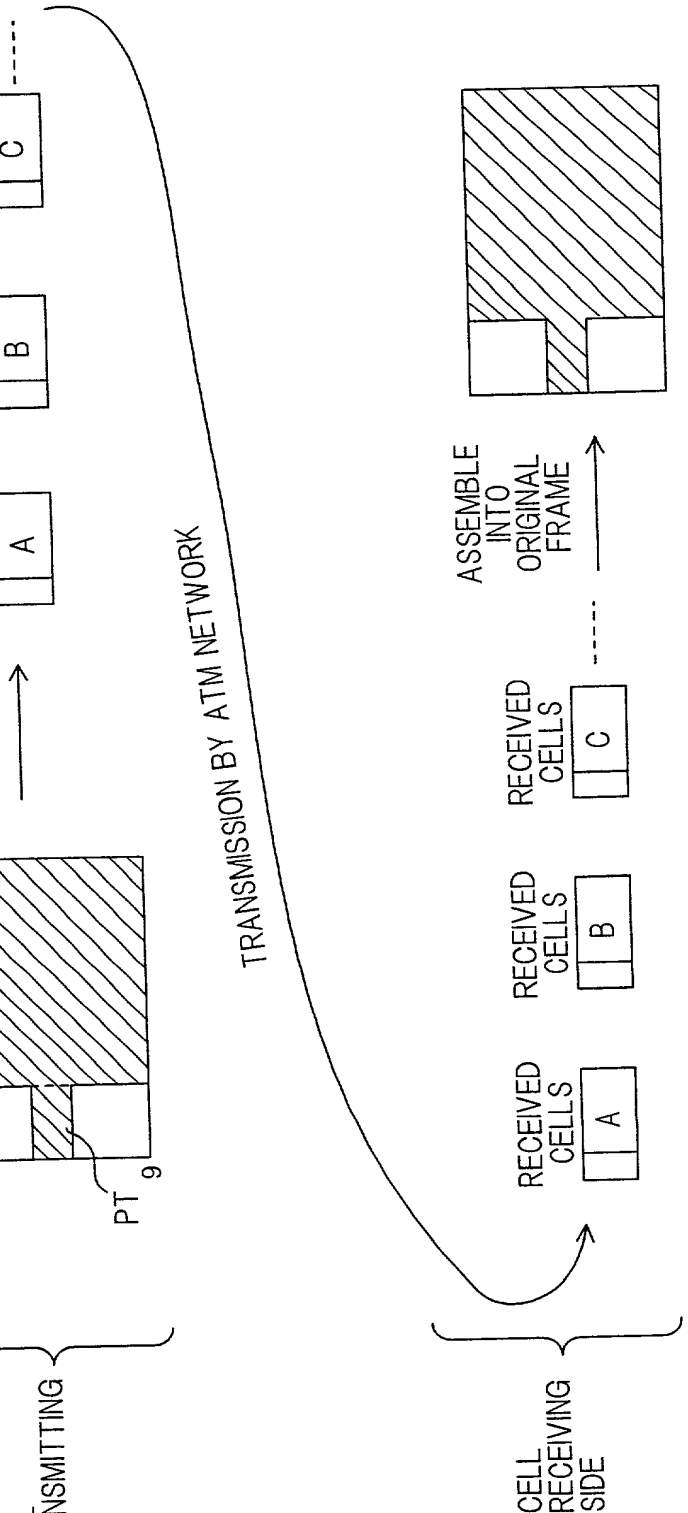
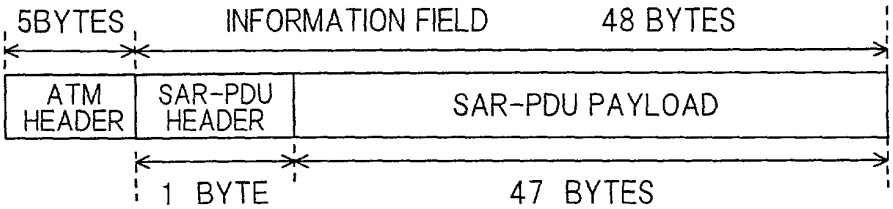
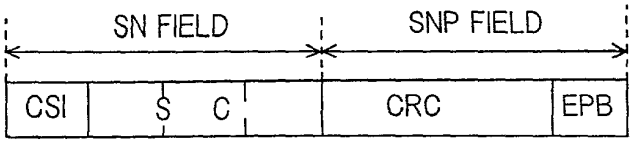

CELL TRANSMITTING SIDE
SPE 270
TOP 10
1
1 2
PT 9
CONVERSION
TRANSMITTED CELLS A
TRANSMITTED CELLS B
TRANSMITTED CELLS C
TRANSMISSION BY ATM NETWORK
RECEIVED CELLS A
RECEIVED CELLS B
RECEIVED CELLS C
ASSEMBLE INTO ORIGINAL FRAME
CELL RECEIVING SIDE

FIG. 4



PDU : Protocol Data Unit

FIG. 5



CSI : Convergence Sublayer Identifier
SC : Sequence Count
CRC : Cyclic Redundancy Check
EPB : Even Parity bit

FIG. 6

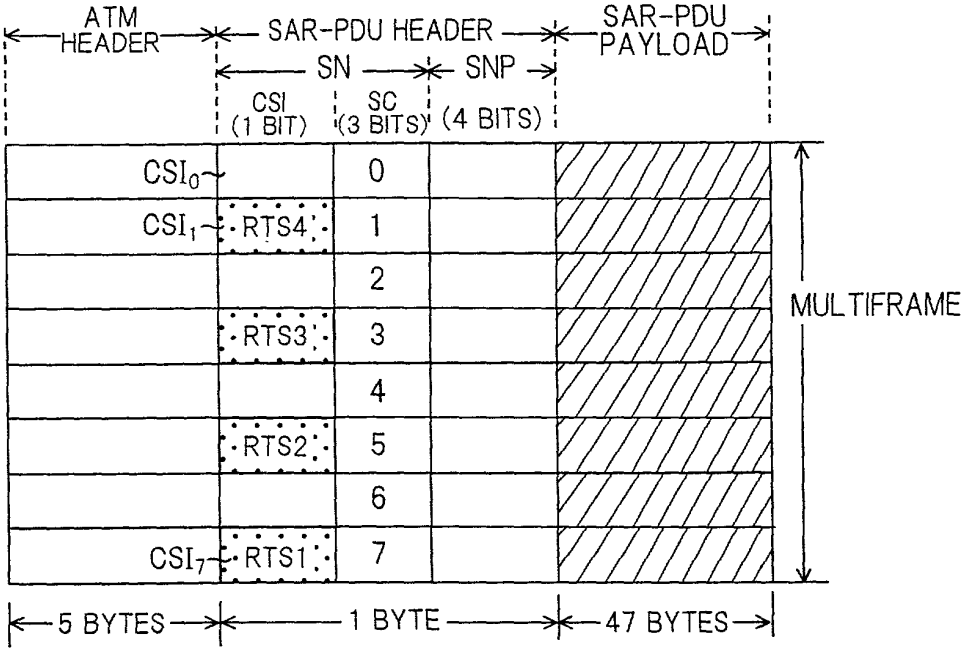


FIG. 7A

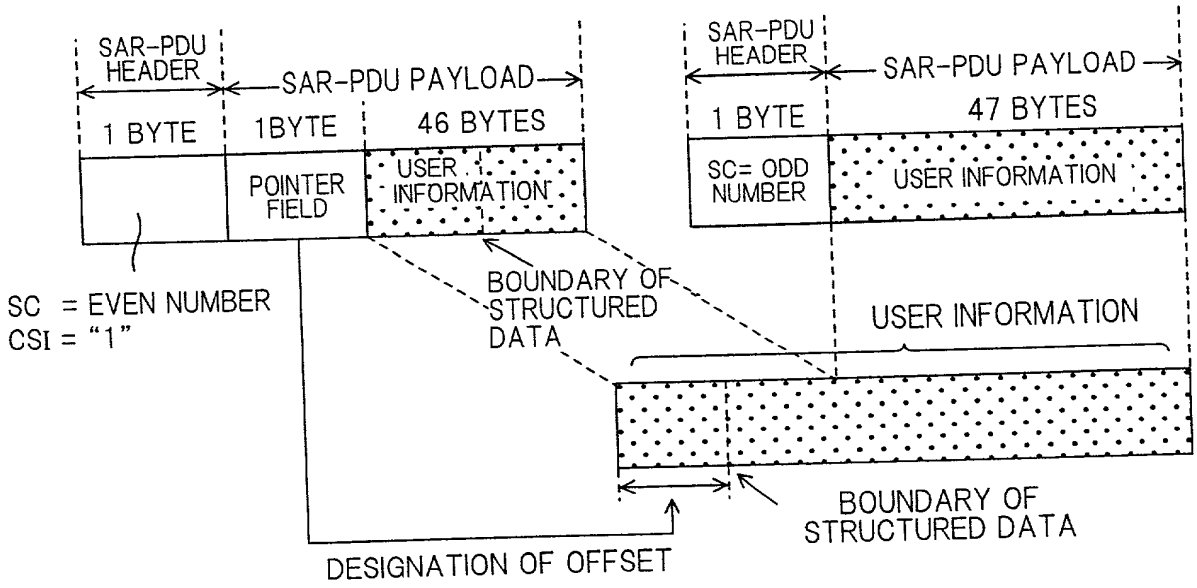

SAR-PDU HEADER
SAR-PDU PAYLOAD
1 BYTE
1BYTE
46 BYTES
POINTER FIELD
USER INFORMATION
SC = EVEN NUMBER
CSI = "1"
BOUNDARY OF STRUCTURED DATA
DESIGNATION OF OFFSET
SAR-PDU HEADER
SAR-PDU PAYLOAD
1 BYTE
47 BYTES
SC= ODD NUMBER
USER INFORMATION
USER INFORMATION
BOUNDARY OF STRUCTURED DATA

FIG. 7B

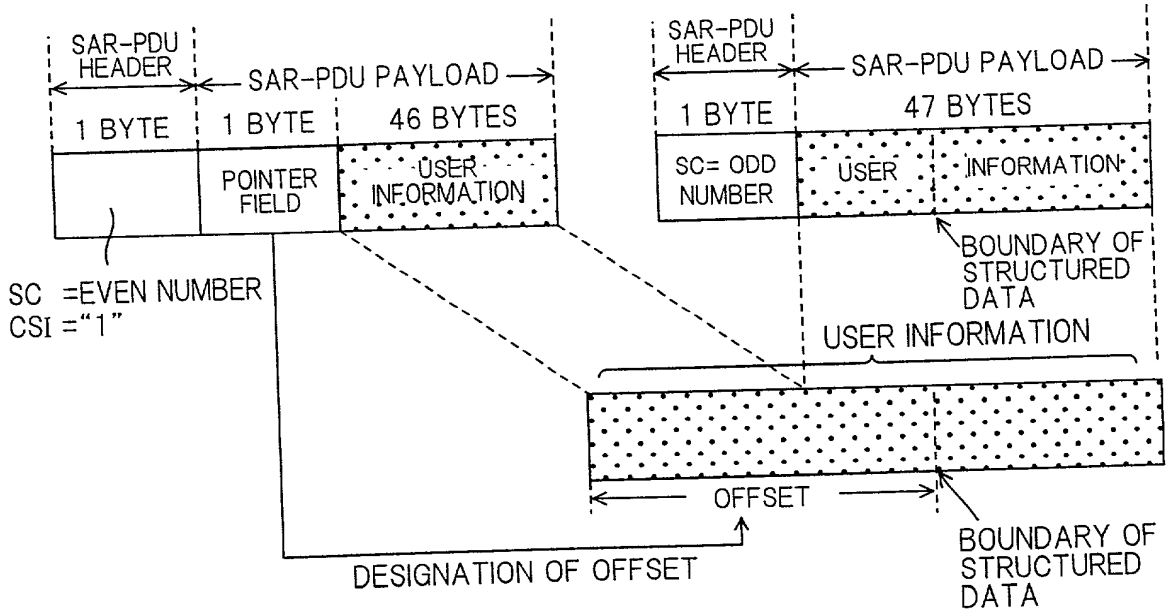

SAR-PDU HEADER
SAR-PDU PAYLOAD
1 BYTE
1 BYTE
46 BYTES
POINTER FIELD
USER INFORMATION
SC =EVEN NUMBER
CSI ="1"
DESIGNATION OF OFFSET
SAR-PDU HEADER
SAR-PDU PAYLOAD
1 BYTE
47 BYTES
SC= ODD NUMBER
USER
INFORMATION
BOUNDARY OF STRUCTURED DATA
USER INFORMATION
OFFSET
BOUNDARY OF STRUCTURED DATA

FIG. 8

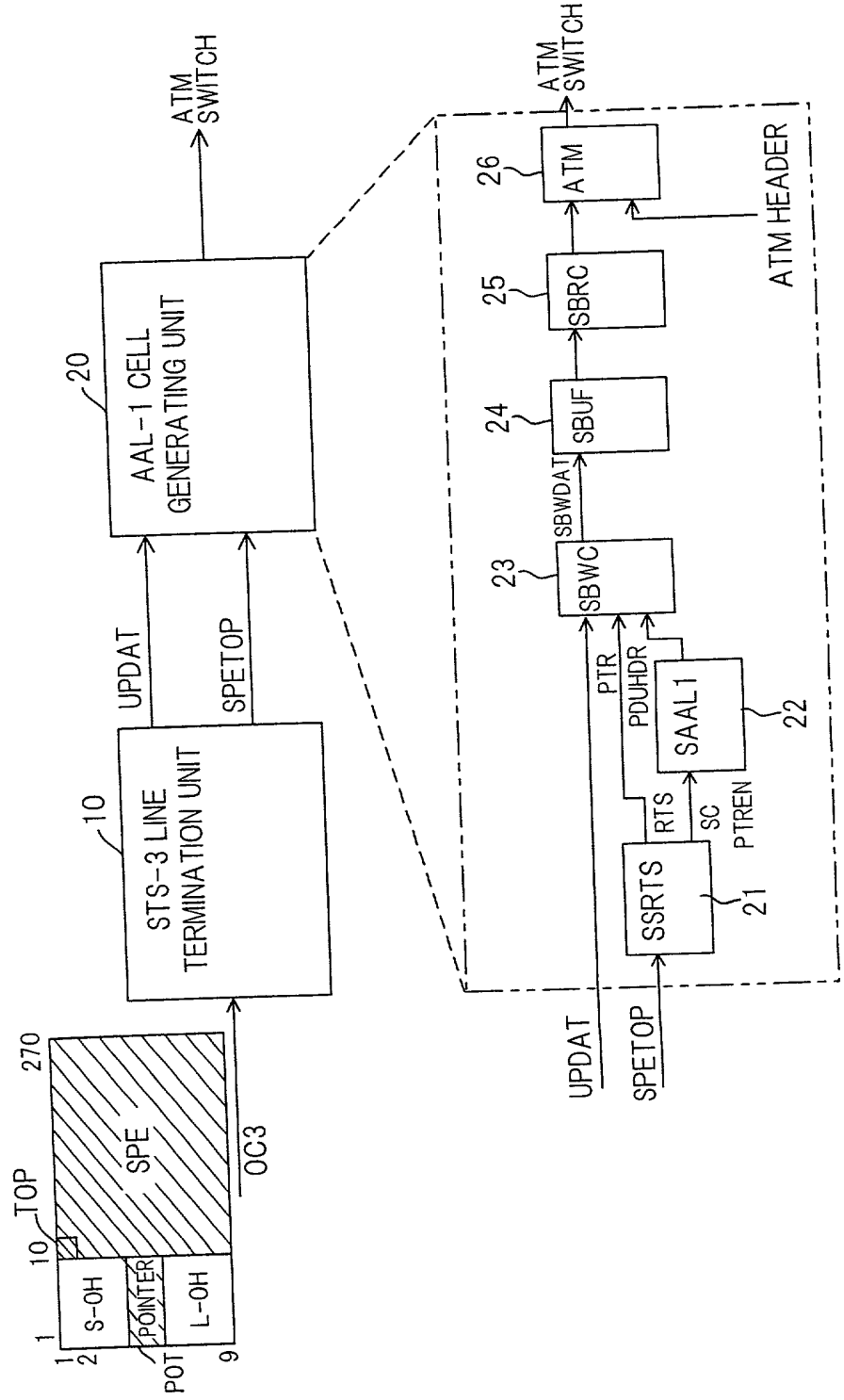

ATM SWITCH
AAL-1 CELL GENERATING UNIT
20
UPDAT
SPETOP
STS-3 LINE TERMINATION UNIT
10
TOP
10
270
SPE
OC3
1
1
2
S-OH
POINTER
POT
L-OH
9
ATM SWITCH
ATM HEADER
26
ATM
25
SBRC
24
SBUF
SBWDAT
23
SBWC
PTR
PDUHDR
SAAL1
22
RTS
SC
PTREN
SSRTS
21
UPDAT
SPETOP

FIG. 9

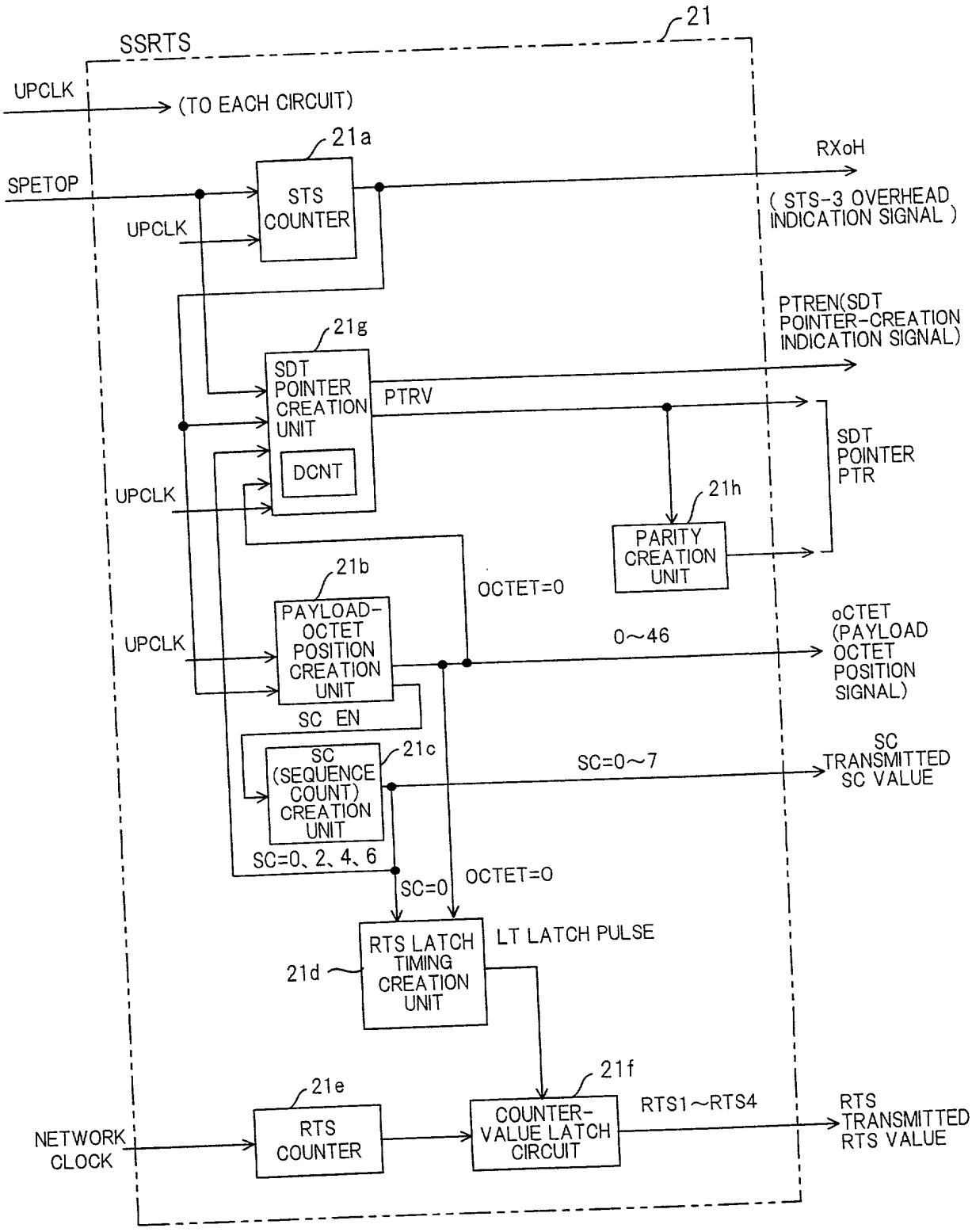

21
SSRTS
UPCLK
(TO EACH CIRCUIT)
21a
SPETOP
STS COUNTER
UPCLK
RXoH
(STS-3 OVERHEAD INDICATION SIGNAL)
PTREN(SDT POINTER-CREATION INDICATION SIGNAL)
21g
SDT POINTER CREATION UNIT
DCNT
PTRV
SDT POINTER PTR
UPCLK
21h
PARITY CREATION UNIT
21b
OCTET=0
PAYLOAD-OCTET POSITION CREATION UNIT
UPCLK
0～46
oCTET (PAYLOAD OCTET POSITION SIGNAL)
SC EN
SC (SEQUENCE COUNT) CREATION UNIT
21c
SC=0～7
SC TRANSMITTED SC VALUE
SC=0、2、4、6
SC=0
OCTET=0
RTS LATCH TIMING CREATION UNIT
LT LATCH PULSE
21d
21f
21e
RTS1～RTS4
RTS TRANSMITTED RTS VALUE
NETWORK CLOCK
RTS COUNTER
COUNTER-VALUE LATCH CIRCUIT

FIG. 10

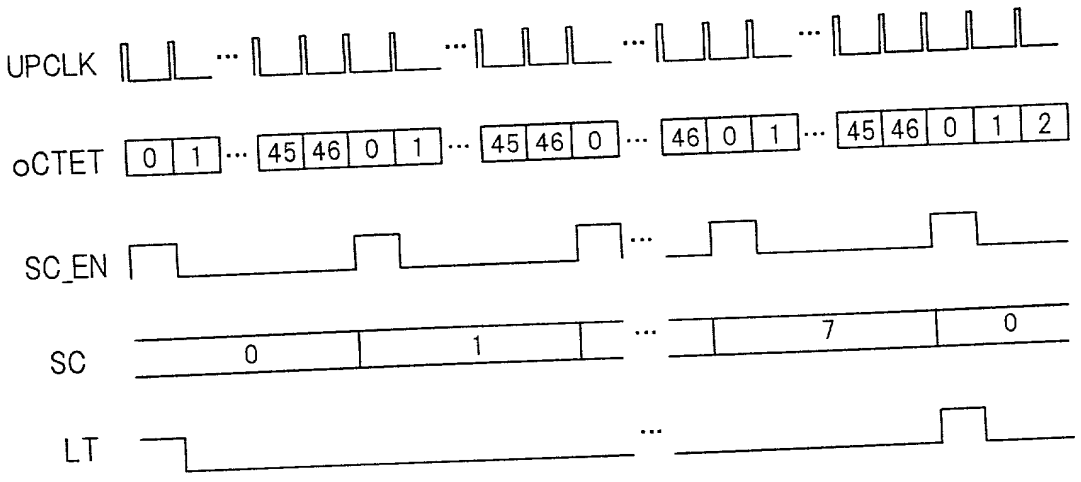


FIG. 11

POSITION REPORTED BY TOP

A1#1 0	A1#2 1	A1#3 2	A2#1 3	A2#2 4	A2#3 5	JO 6	Z0#2 7	Z0#3 8	SPE 9	SPE 10	SPE 11	.....	SPE 267	SPE 268	SPE 269
B1 270	X 271	X 272	E1 273	X 274	X 275	F1 276	X 277	X 278	SPE 279	SPE 280	SPE 281	.....	SPE 537	SPE 538	SPE 539
D1 540	X 541	X 542	D2 543	X 544	X 545	D3 546	X 547	X 548	SPE 549	SPE 550	SPE 551	.....	SPE 807	SPE 808	SPE 809
H1#1 810	H1#2 811	H1#3 812	H2#1 813	H2#2 814	H2#3 815	H3#1 816	H3#2 817	H3#3 818	SPE 819	SPE 820	SPE 821	.....	SPE 1077	SPE 1078	SPE 1079
B2#1 1080	B2#2 1081	B2#3 1082	K1 1083	X 1084	X 1085	K2 1086	X 1087	X 1088	SPE 1089	SPE 1090	SPE 1091	.....	SPE 1347	SPE 1348	SPE 1349
D4 1350	X 1351	X 1352	D5 1353	X 1354	X 1355	D6 1356	X 1357	X 1358	SPE 1359	SPE 1360	SPE 1361	.....	SPE 1617	SPE 1618	SPE 1619
D7 1620	X 1621	X 1622	D8 1623	X 1624	X 1625	D9 1626	X 1627	X 1628	SPE 1629	SPE 1630	SPE 1631	.....	SPE 1887	SPE 1888	SPE 1889
D10 1890	X 1891	X 1892	D11 1893	X 1894	X 1895	D12 1896	X 1897	X 1898	SPE 1899	SPE 1900	SPE 1901	.....	SPE 2157	SPE 2158	SPE 2159
S1 2160	Z1#2 2161	Z1#3 2162	MO 2163	Z2#2 2164	Z2#3 2165	E2 2166	X 2167	X 2168	SPE 2169	SPE 2170	SPE 2171	.....	SPE 2427	SPE 2428	SPE 2429

*LOWER VALUE IS VALUE OF STS-CTR COUNT
*BYTES WITHIN BOLD BORDER UNDERGO AAL-1 CONVERSION (RXoH = "0")

FIG. 12

POSITION REPORTED BY TOP

A1#1	A1#2	A1#3	A2#1	A2#2	A2#3	J0	Z0#2	Z0#3	SPE 2357	SPE 2356	SPE 2355	----------	SPE 2099	SPE 2098	SPE 2097
B1	X	X	E1	X	X	F1	X	X	SPE 2096	SPE 2095	SPE 2094	----------	SPE 1838	SPE 1837	SPE 1836
D1	X	X	D2	X	X	D3	X	X	SPE 1835	SPE 1834	SPE 1833	----------	SPE 1577	SPE 1576	SPE 1575
H1#1 1574	H1#2 1573	H1#3 1572	H2#1 1571	H2#2 1570	H2#3 1569	H3#1 1568	H3#2 1567	H3#3 1566	SPE 1565	SPE 1564	SPE 1563	----------	SPE 1307	SPE 1306	SPE 1305
B2#1	B2#2	B2#3	K1	X	X	K2	X	X	SPE 1304	SPE 1303	SPE 1302	----------	SPE 1046	SPE 1045	SPE 1044
D4	X	X	D5	X	X	D6	X	X	SPE 1043	SPE 1042	SPE 1041	----------	SPE 785	SPE 784	SPE 783
D7	X	X	D8	X	X	D9	X	X	SPE 782	SPE 781	SPE 780	----------	SPE 524	SPE 523	SPE 522
D10	X	X	D11	X	X	D12	X	X	SPE 521	SPE 520	SPE 519	----------	SPE 263	SPE 262	SPE 261
S1	Z1#2	Z1#3	MO	Z2#2	Z2#3	E2	X	X	SPE 260	SPE 259	SPE 258	----------	SPE 2	SPE 1	SPE 0

*LOWER VALUE IS VALUE OF DCNT COUNT
*BYTES WITHIN BOLD BORDER UNDERGO AAL-1 CONVERSION (RXoH = "0")

TOSTED" TD0992680

FIG. 13

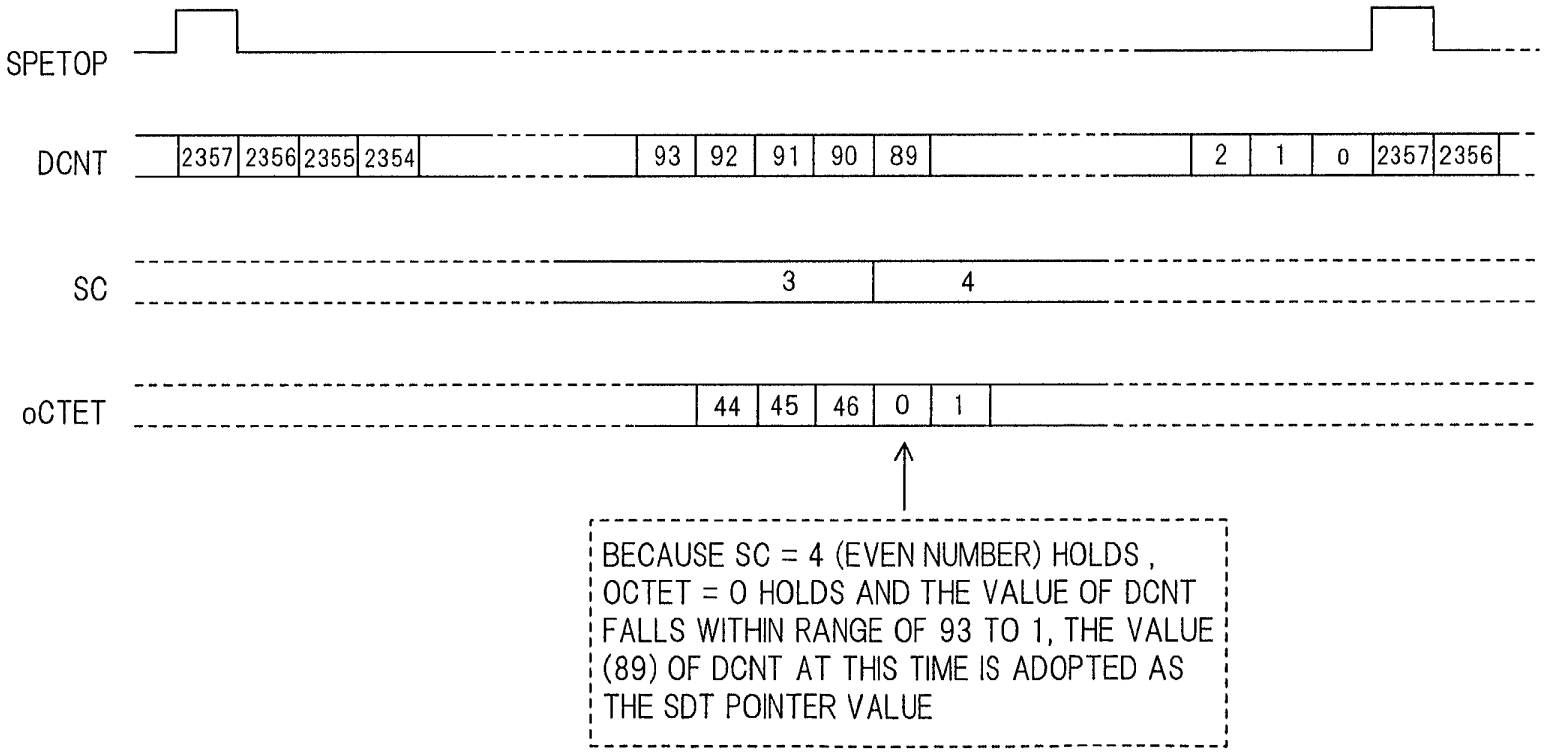


FIG. 14

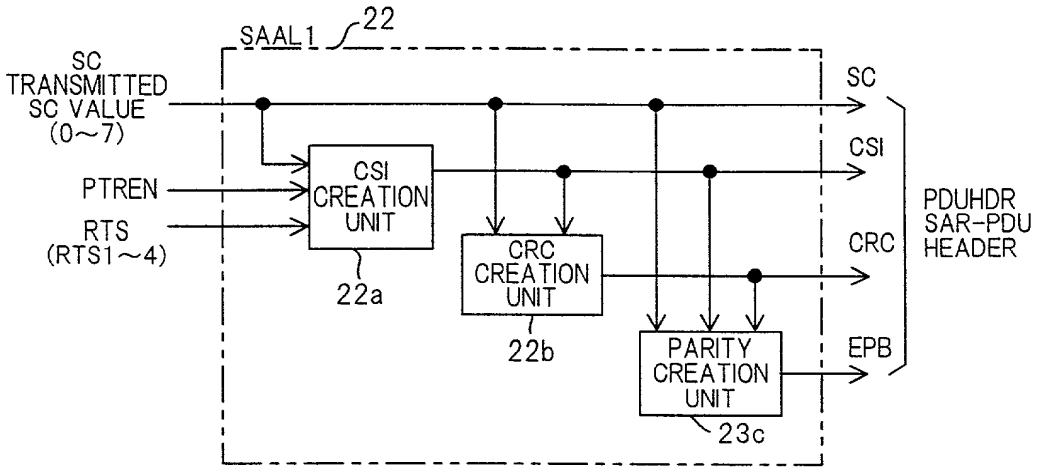


FIG. 15

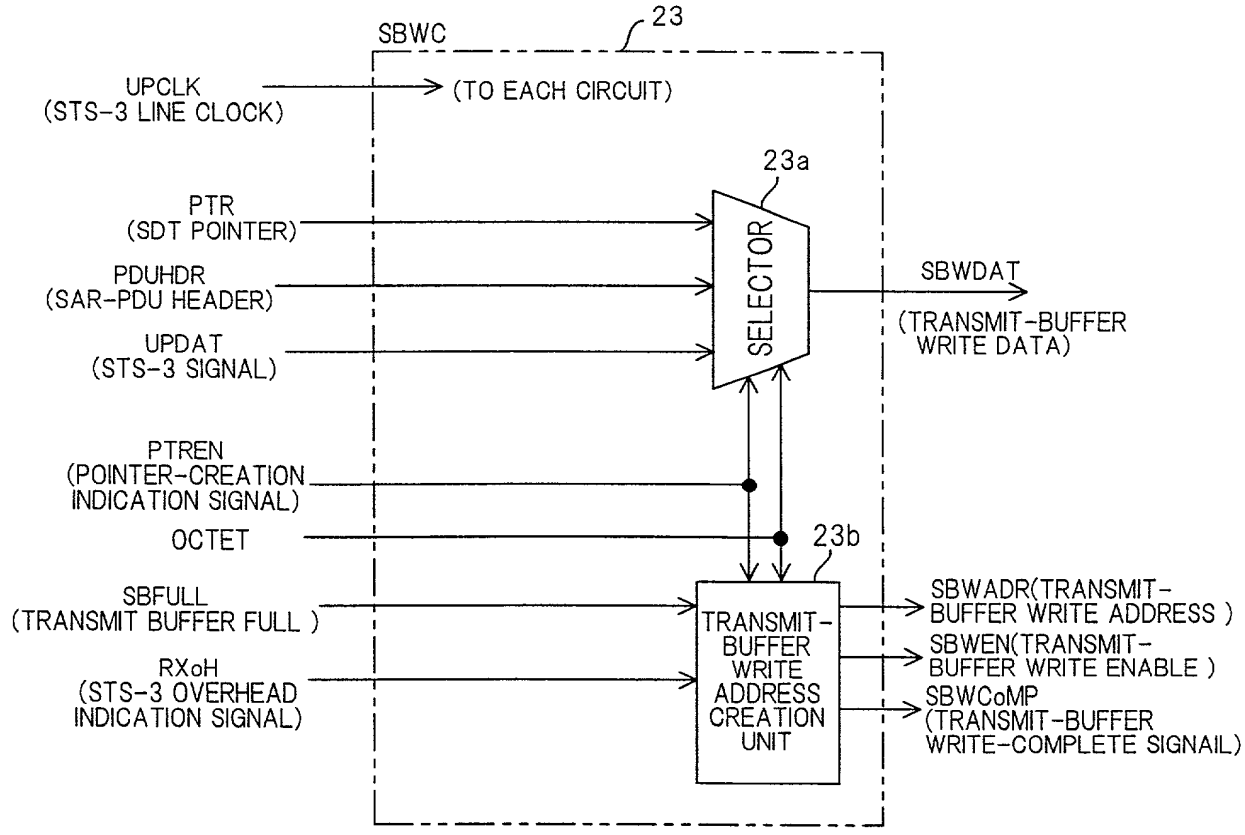


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FIG. 16

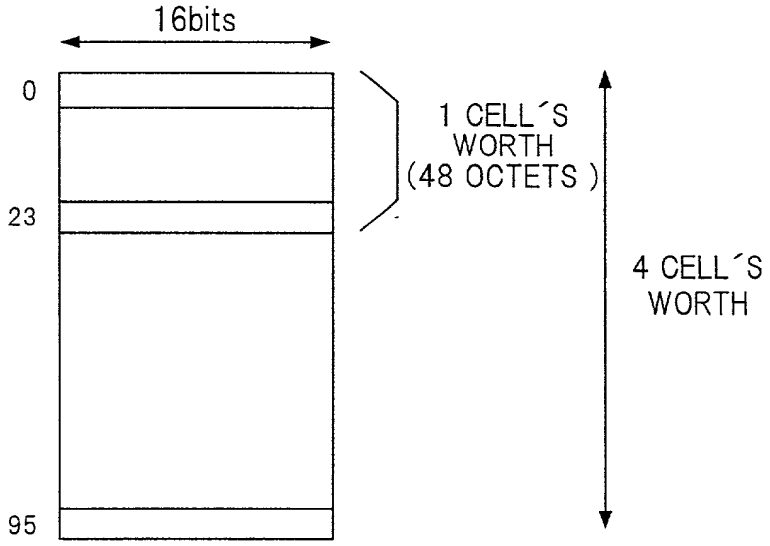

FIG. 17A

non P-format

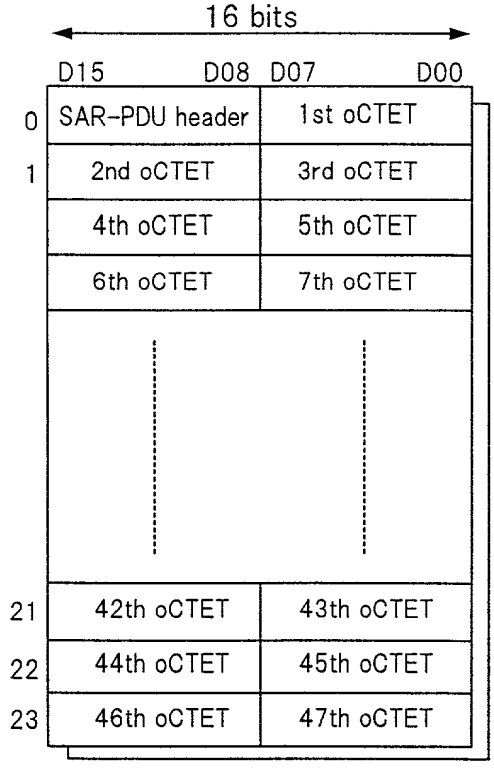

FIG. 17B

P-format

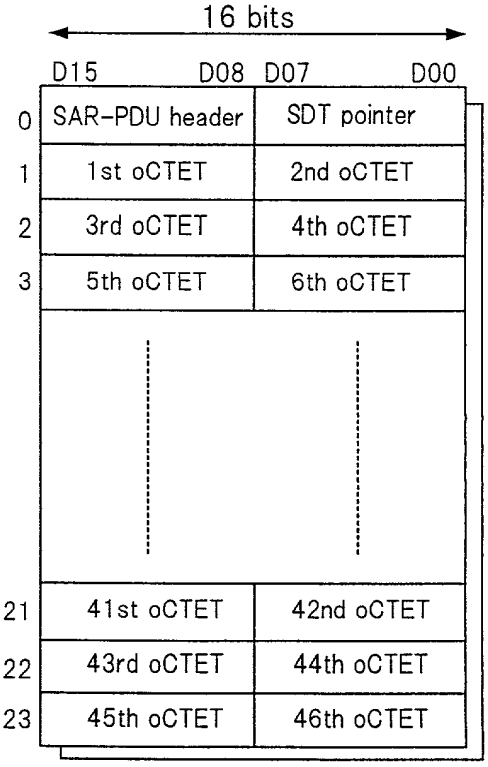

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FIG. 18

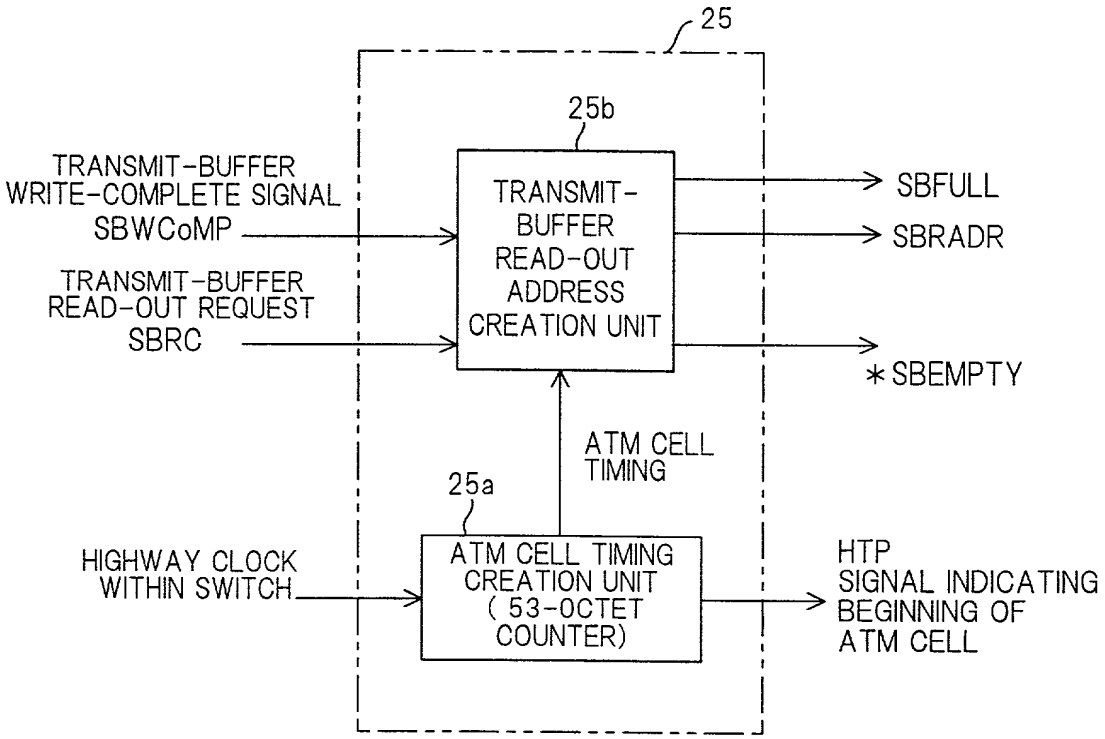

25
25b
TRANSMIT-BUFFER WRITE-COMPLETE SIGNAL SBWCoMP
TRANSMIT-BUFFER READ-OUT REQUEST SBRC
TRANSMIT-BUFFER READ-OUT ADDRESS CREATION UNIT
SBFULL
SBRADR
*SBEMPTY
ATM CELL TIMING
25a
HIGHWAY CLOCK WITHIN SWITCH
ATM CELL TIMING CREATION UNIT (53-OCTET COUNTER)
HTP SIGNAL INDICATING BEGINNING OF ATM CELL

FIG. 19

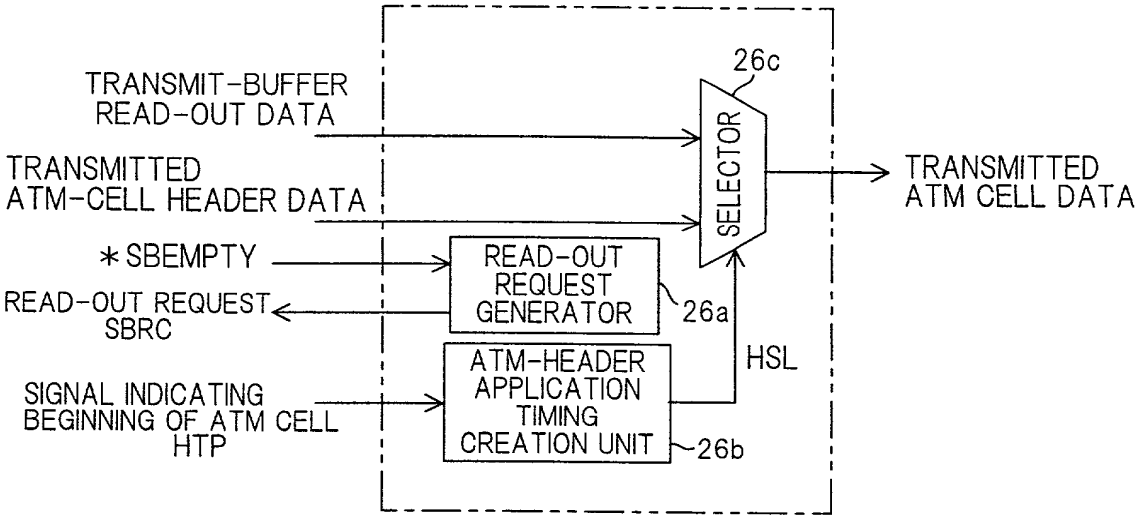
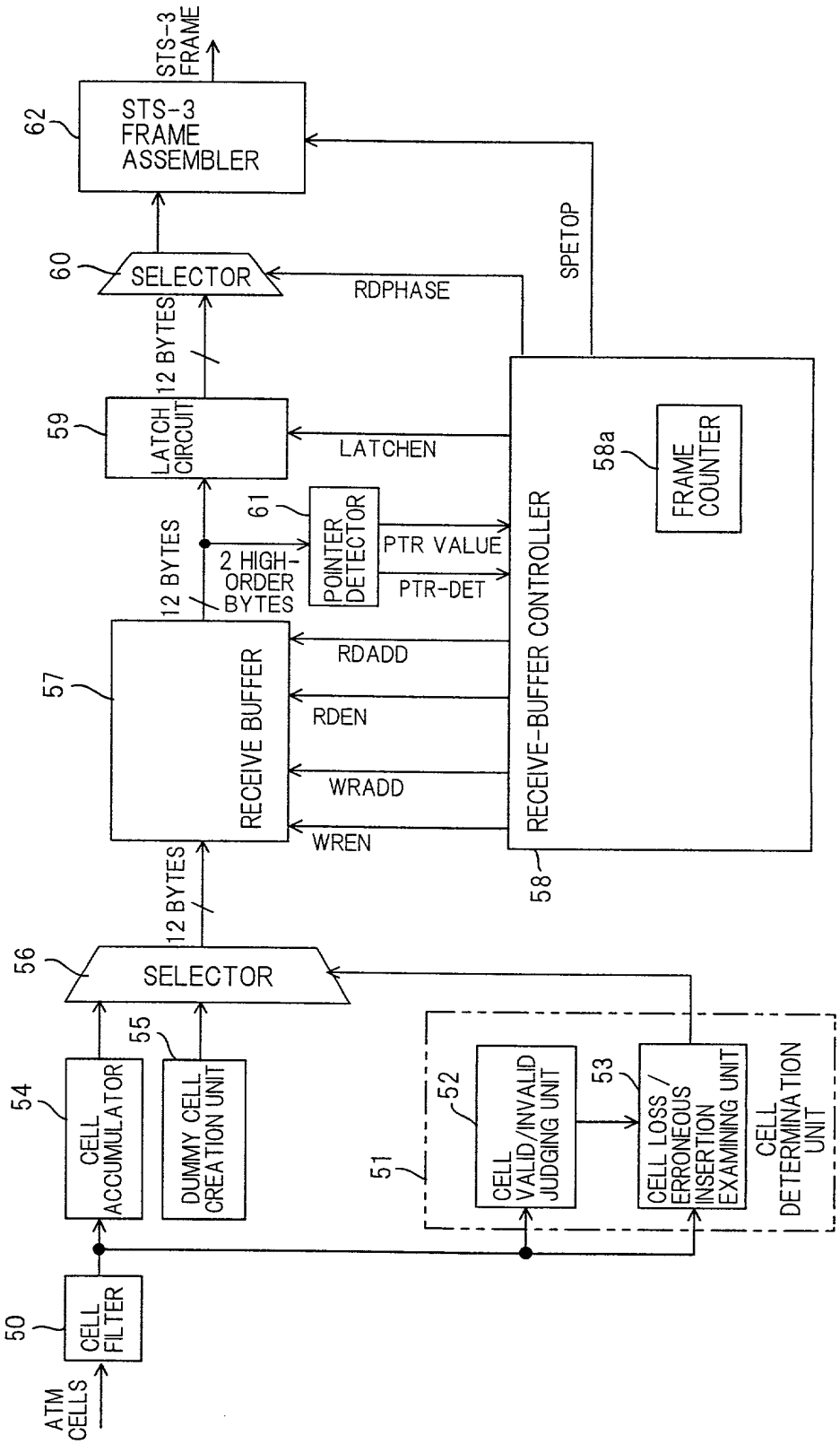

TRANSMIT-BUFFER READ-OUT DATA
TRANSMITTED ATM-CELL HEADER DATA
26c
SELECTOR
TRANSMITTED ATM CELL DATA
*SBEMPTY
READ-OUT REQUEST GENERATOR
26a
READ-OUT REQUEST SBRC
HSL
ATM-HEADER APPLICATION TIMING CREATION UNIT
26b
SIGNAL INDICATING BEGINNING OF ATM CELL HTP

FIG. 20


ATM CELLS
50
CELL FILTER
54
CELL ACCUMULATOR
55
DUMMY CELL CREATION UNIT
56
SELECTOR
12 BYTES
57
RECEIVE BUFFER
12 BYTES
2 HIGH-ORDER BYTES
61
POINTER DETECTOR
PTR VALUE
PTR-DET
RDADD
RDEN
WRADD
WREN
58
RECEIVE-BUFFER CONTROLLER
58a
FRAME COUNTER
LATCHEN
59
LATCH CIRCUIT
12 BYTES
60
SELECTOR
RDPHASE
SPETOP
62
STS-3 FRAME ASSEMBLER
STS-3 FRAME
51
52
CELL VALID/INVALID JUDGING UNIT
53
CELL LOSS / ERRONEOUS INSERTION EXAMINING UNIT
CELL DETERMINATION UNIT

TOSTO" TOOS9260

FIG. 21A

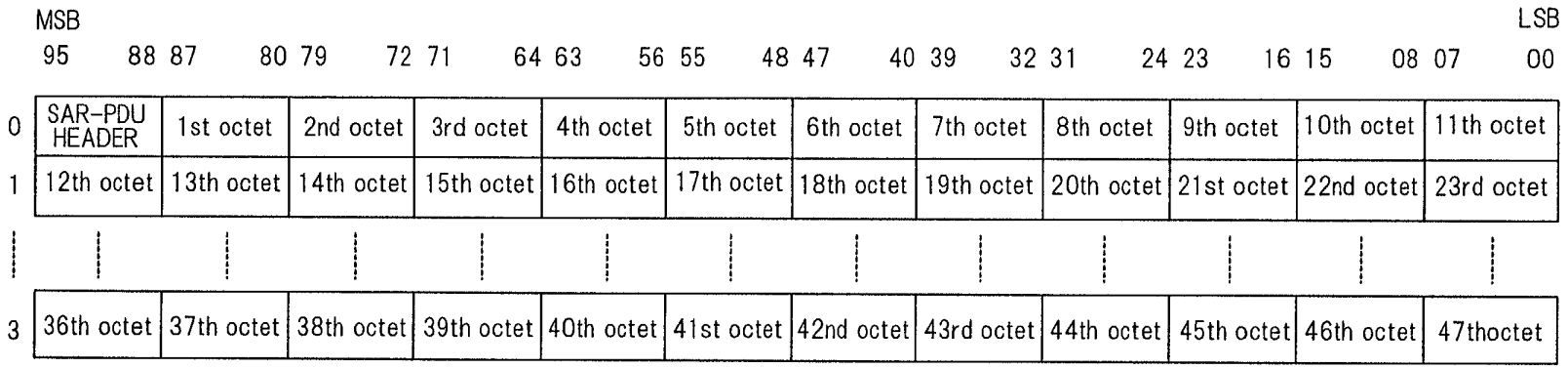


FIG. 21B

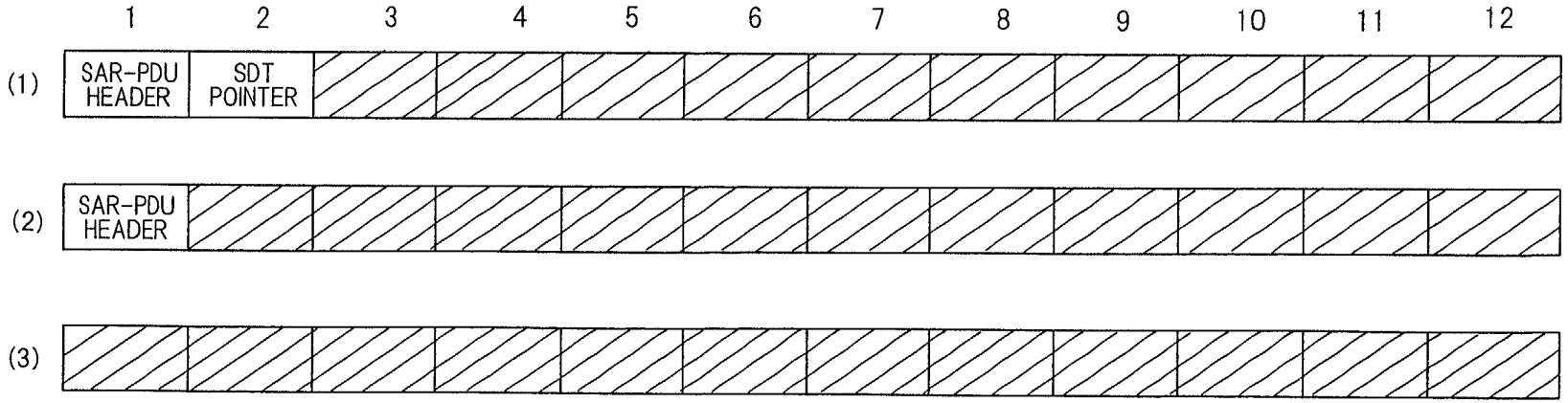


FIG. 22

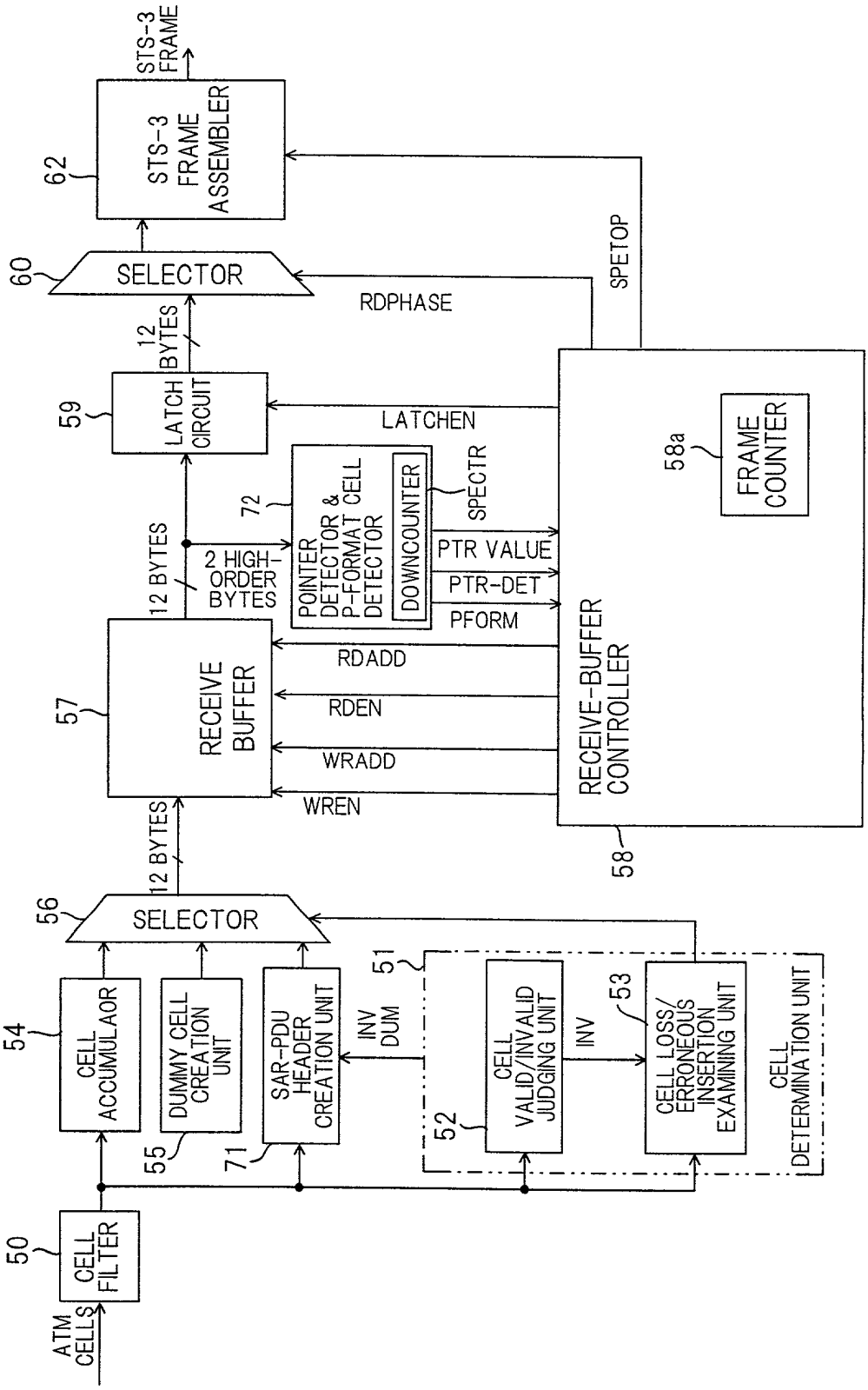
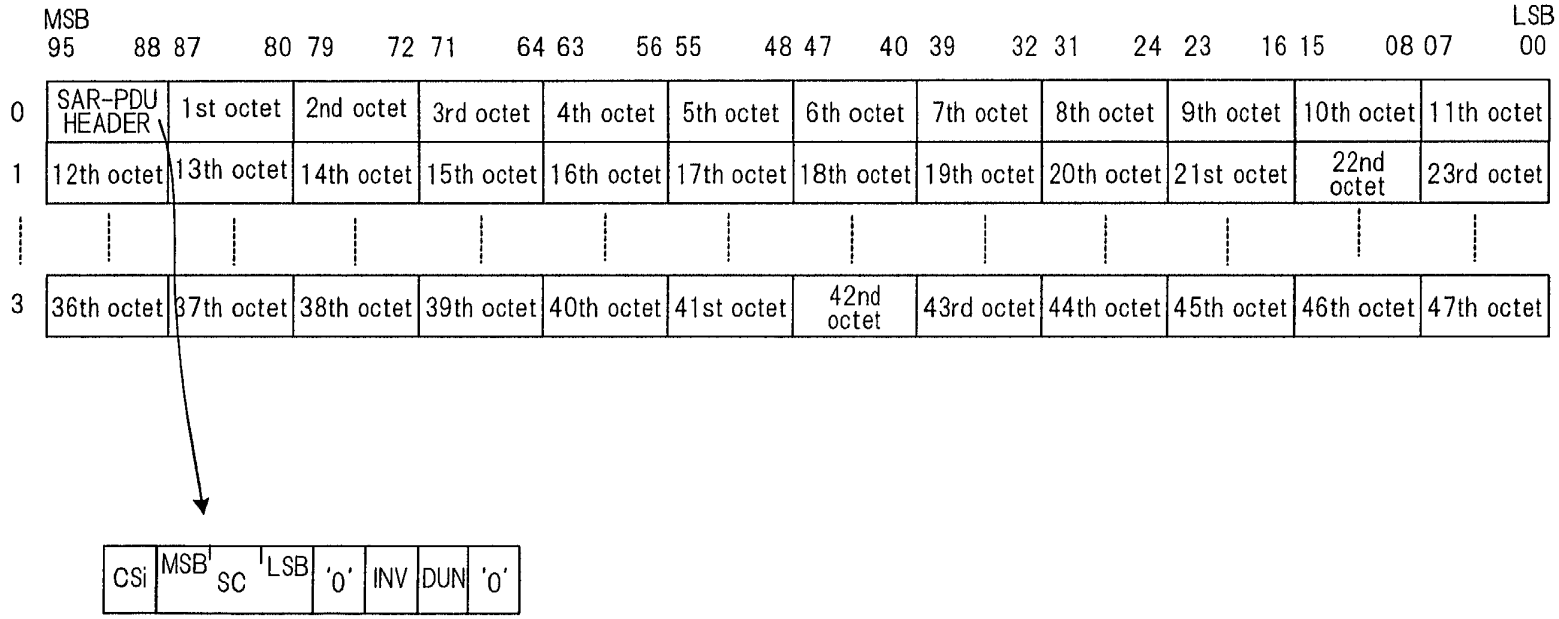

ATM CELLS
CELL FILTER
50
CELL ACCUMULAOR
54
DUMMY CELL CREATION UNIT
55
SAR-PDU HEADER CREATION UNIT
71
INV
DUM
CELL VALID/INVALID JUDGING UNIT
52
INV
CELL LOSS/ ERRONEOUS INSERTION EXAMINING UNIT
53
CELL DETERMINATION UNIT
51
SELECTOR
56
12 BYTES
RECEIVE BUFFER
57
RDADD
RDEN
WRADD
WREN
RECEIVE-BUFFER CONTROLLER
58
FRAME COUNTER
58a
SPETOP
RDPHASE
SELECTOR
60
STS-3 FRAME ASSEMBLER
62
STS-3 FRAME
12 BYTES
LATCH CIRCUIT
59
LATCHEN
12 BYTES
2 HIGH-ORDER BYTES
72
POINTER DETECTOR & P-FORMAT CELL DETECTOR
DOWNCOUNTER
SPECTR
PTR VALUE
PTR-DET
PFORM

FIG. 23



CSi : INDICATES P-FORMAT (0: NON-P-FORMAT, 1: P-FORMAT)

SC : SEQUENCE COUNT VALUE

INV : INDICATES HEADER INVALID (0: VALID、 1: INVALID)

DUM : DUMMY CELL FLAG (0: ORDINARY CELL, 1: DUMMY CELL)

FIG. 24

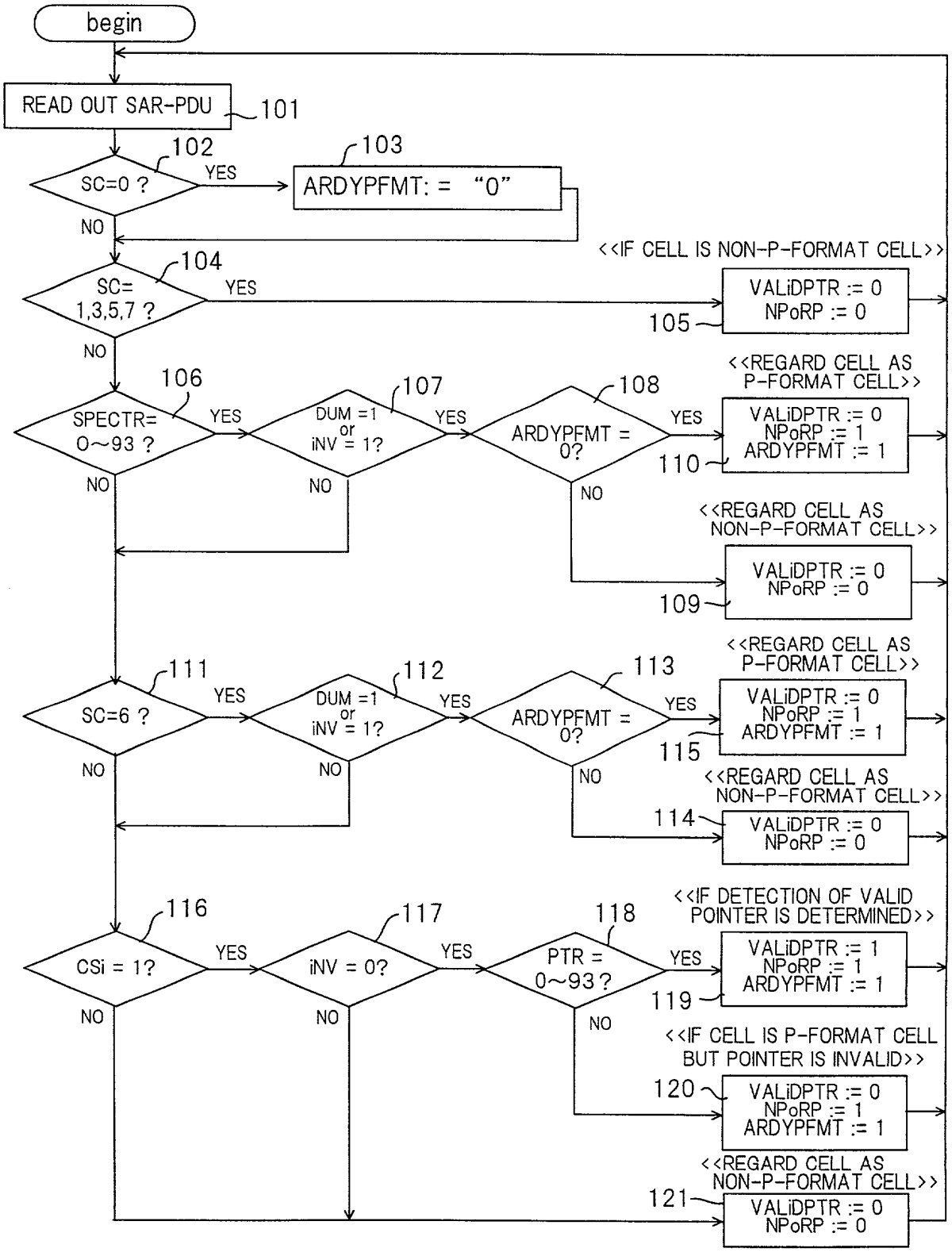

begin
READ OUT SAR-PDU
101
SC=0 ?
102
YES
ARDYPFMT: = "0"
103
NO
<<IF CELL IS NON-P-FORMAT CELL>>
SC= 1,3,5,7 ?
104
YES
VALiDPTR := 0
NPoRP := 0
105
NO
<<REGARD CELL AS P-FORMAT CELL>>
SPECTR= 0~93 ?
106
YES
DUM =1 or iNV = 1?
107
YES
ARDYPFMT = 0?
108
YES
VALiDPTR := 0
NPoRP := 1
ARDYPFMT := 1
110
NO
NO
NO
<<REGARD CELL AS NON-P-FORMAT CELL>>
VALiDPTR := 0
NPoRP := 0
109
<<REGARD CELL AS P-FORMAT CELL>>
SC=6 ?
111
YES
DUM =1 or iNV = 1?
112
YES
ARDYPFMT = 0?
113
YES
VALiDPTR := 0
NPoRP := 1
ARDYPFMT := 1
115
NO
NO
NO
<<REGARD CELL AS NON-P-FORMAT CELL>>
VALiDPTR := 0
NPoRP := 0
114
<<IF DETECTION OF VALID POINTER IS DETERMINED>>
CSi = 1?
116
YES
iNV = 0?
117
YES
PTR = 0~93 ?
118
YES
VALiDPTR := 1
NPoRP := 1
ARDYPFMT := 1
119
NO
NO
NO
<<IF CELL IS P-FORMAT CELL BUT POINTER IS INVALID>>
VALiDPTR := 0
NPoRP := 1
ARDYPFMT := 1
120
<<REGARD CELL AS NON-P-FORMAT CELL>>
VALiDPTR := 0
NPoRP := 0
121

FIG. 25

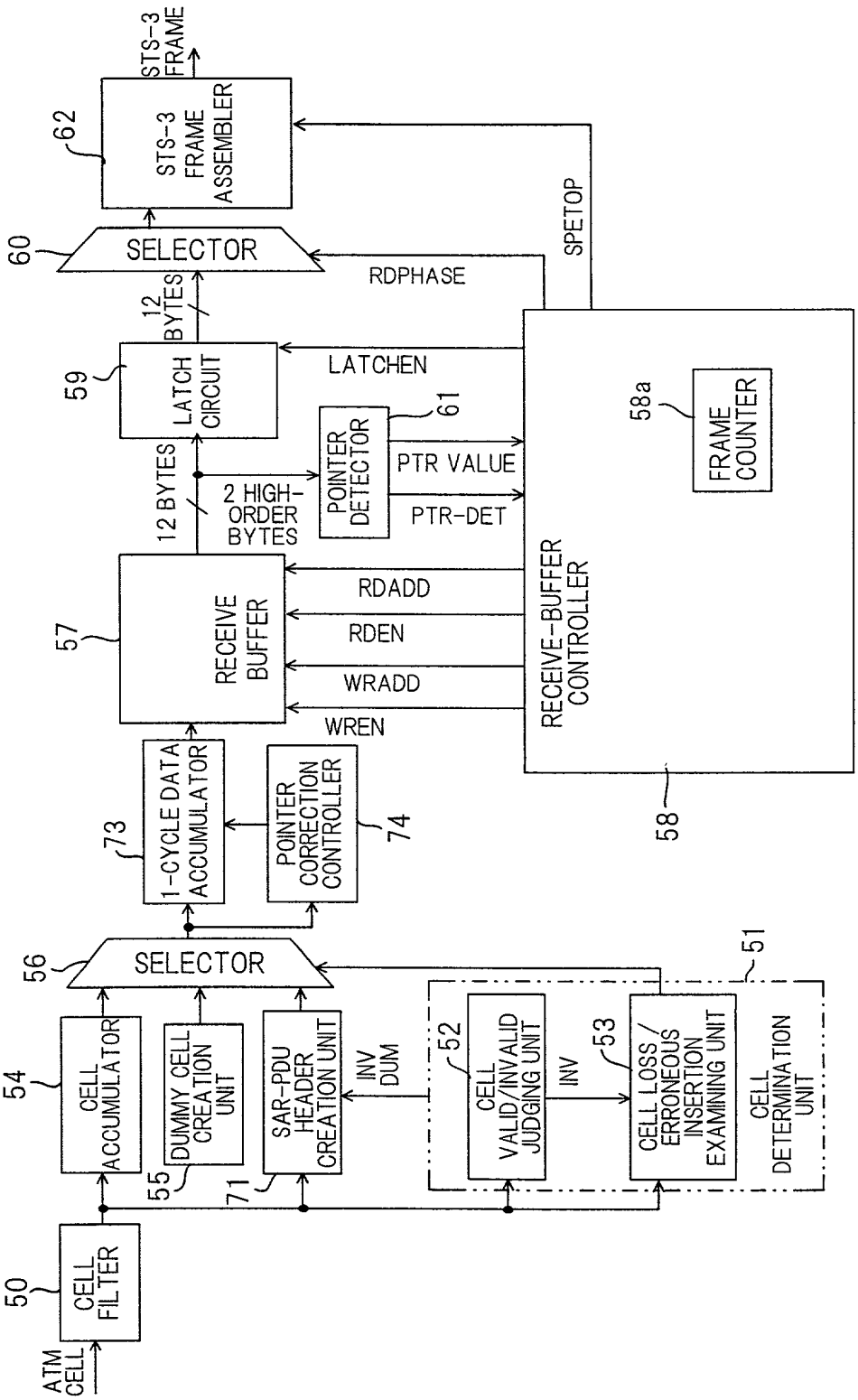

ATM CELL
50
CELL FILTER
54
CELL ACCUMULATOR
55
DUMMY CELL CREATION UNIT
71
SAR-PDU HEADER CREATION UNIT
INV
DUM
56
SELECTOR
51
52
CELL VALID/INVALID JUDGING UNIT
INV
53
CELL LOSS / ERRONEOUS INSERTION EXAMINING UNIT
CELL DETERMINATION UNIT
73
1-CYCLE DATA ACCUMULATOR
74
POINTER CORRECTION CONTROLLER
57
RECEIVE BUFFER
RDADD
RDEN
WRADD
WREN
58
RECEIVE-BUFFER CONTROLLER
58a
FRAME COUNTER
12 BYTES
2 HIGH-ORDER BYTES
61
POINTER DETECTOR
PTR VALUE
PTR-DET
59
LATCH CIRCUIT
LATCHEN
12 BYTES
60
SELECTOR
RDPHASE
SPETOP
62
STS-3 FRAME ASSEMBLER
STS-3 FRAME

FIG. 26

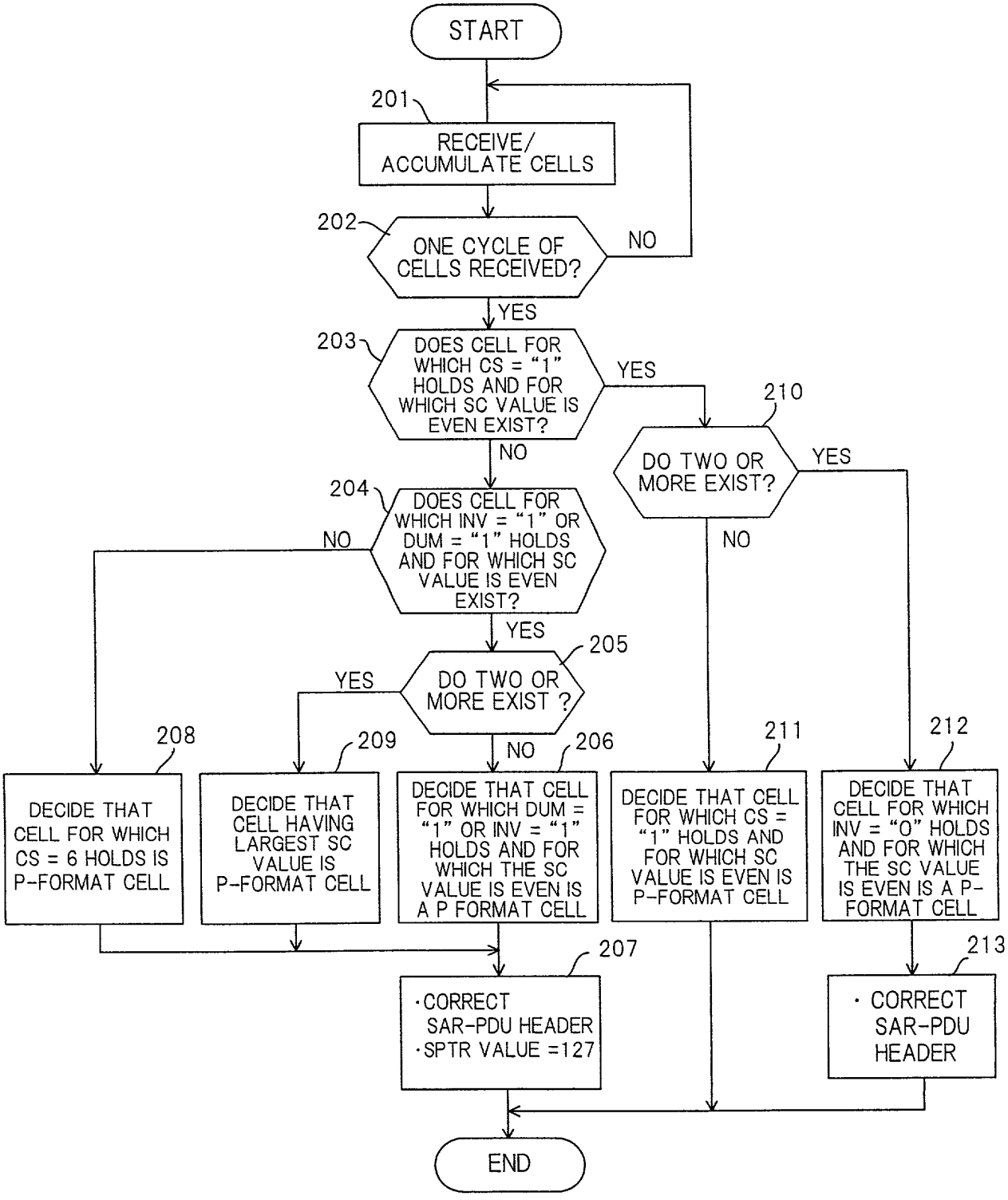

START
201
RECEIVE/ ACCUMULATE CELLS
202
ONE CYCLE OF CELLS RECEIVED?
NO
YES
203
DOES CELL FOR WHICH CS = "1" HOLDS AND FOR WHICH SC VALUE IS EVEN EXIST?
YES
210
DO TWO OR MORE EXIST?
YES
NO
204
DOES CELL FOR WHICH INV = "1" OR DUM = "1" HOLDS AND FOR WHICH SC VALUE IS EVEN EXIST?
NO
YES
205
DO TWO OR MORE EXIST ?
YES
NO
208
DECIDE THAT CELL FOR WHICH CS = 6 HOLDS IS P-FORMAT CELL
209
DECIDE THAT CELL HAVING LARGEST SC VALUE IS P-FORMAT CELL
206
DECIDE THAT CELL FOR WHICH DUM = "1" OR INV = "1" HOLDS AND FOR WHICH THE SC VALUE IS EVEN IS A P FORMAT CELL
211
DECIDE THAT CELL FOR WHICH CS = "1" HOLDS AND FOR WHICH SC VALUE IS EVEN IS P-FORMAT CELL
212
DECIDE THAT CELL FOR WHICH INV = "0" HOLDS AND FOR WHICH THE SC VALUE IS EVEN IS A P-FORMAT CELL
207
·CORRECT SAR-PDU HEADER
·SPTR VALUE =127
213
· CORRECT SAR-PDU HEADER
END

FIG. 27

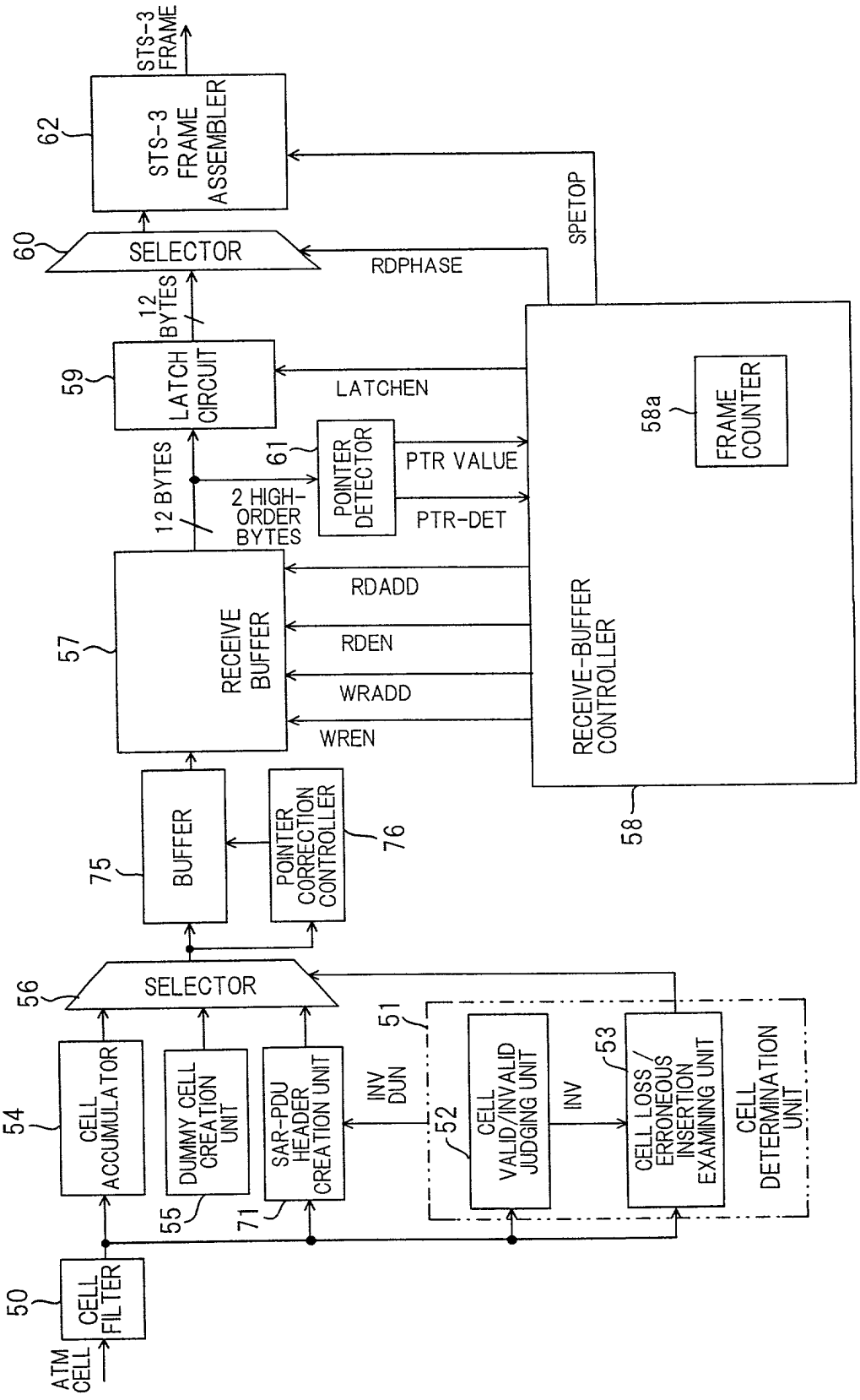

ATM CELL
50
CELL FILTER
54
CELL ACCUMULATOR
55
DUMMY CELL CREATION UNIT
71
SAR-PDU HEADER CREATION UNIT
56
SELECTOR
INV
DUN
51
52
CELL VALID/INVALID JUDGING UNIT
INV
53
CELL LOSS/ERRONEOUS INSERTION EXAMINING UNIT
CELL DETERMINATION UNIT
75
BUFFER
POINTER CORRECTION CONTROLLER
76
57
RECEIVE BUFFER
RDADD
RDEN
WRADD
WREN
58
RECEIVE-BUFFER CONTROLLER
58a
FRAME COUNTER
SPETOP
RDPHASE
60
SELECTOR
12 BYTES
59
LATCH CIRCUIT
LATCHEN
12 BYTES
2 HIGH-ORDER BYTES
61
POINTER DETECTOR
PTR VALUE
PTR-DET
62
STS-3 FRAME ASSEMBLER
STS-3 FRAME

FIG. 28

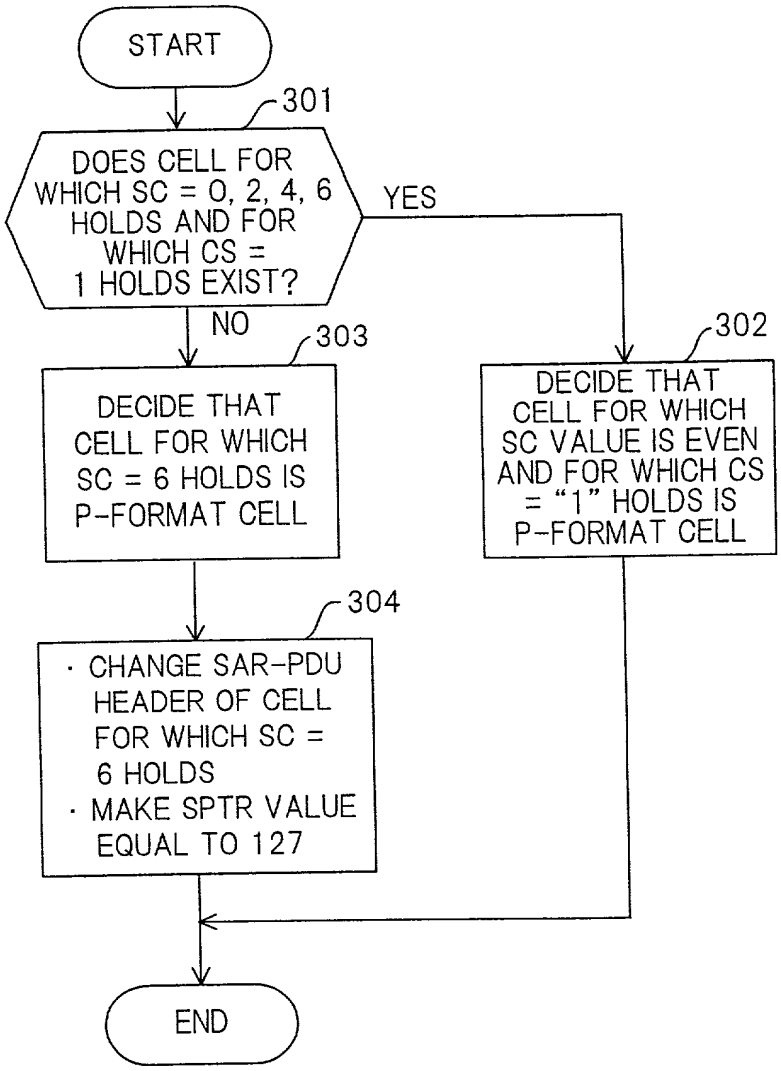

START
301
DOES CELL FOR WHICH SC = 0, 2, 4, 6 HOLDS AND FOR WHICH CS = 1 HOLDS EXIST?
YES
NO
303
DECIDE THAT CELL FOR WHICH SC = 6 HOLDS IS P-FORMAT CELL
302
DECIDE THAT CELL FOR WHICH SC VALUE IS EVEN AND FOR WHICH CS = "1" HOLDS IS P-FORMAT CELL
304
· CHANGE SAR-PDU HEADER OF CELL FOR WHICH SC = 6 HOLDS
· MAKE SPTR VALUE EQUAL TO 127
END

FIG. 29

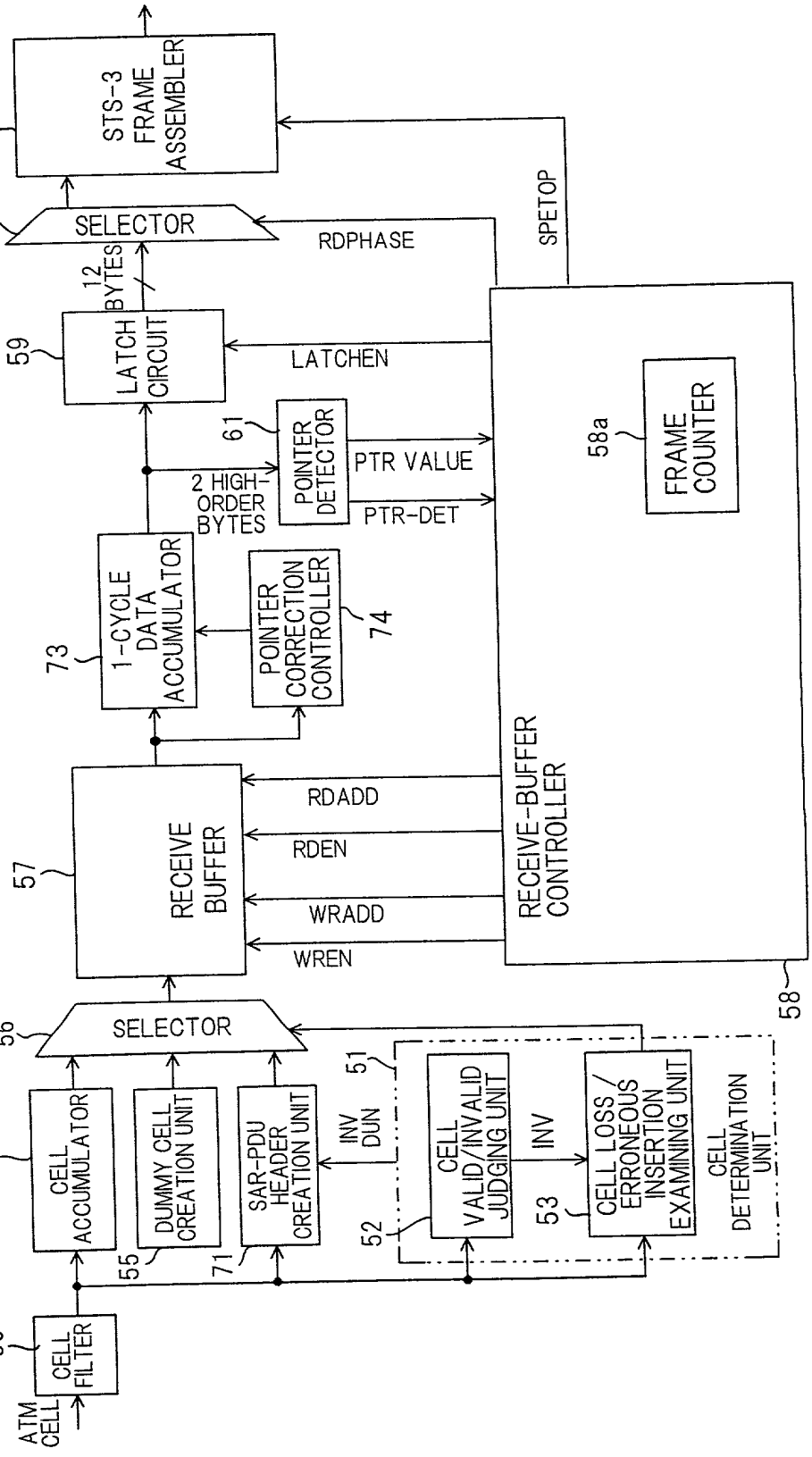

ATM CELL
50
CELL FILTER
54
CELL ACCUMULATOR
55
DUMMY CELL CREATION UNIT
71
SAR-PDU HEADER CREATION UNIT
INV
DUN
51
52
CELL VALID/INVALID JUDGING UNIT
INV
53
CELL LOSS / ERRONEOUS INSERTION EXAMINING UNIT
CELL DETERMINATION UNIT
56
SELECTOR
57
RECEIVE BUFFER
RDADD
RDEN
WRADD
WREN
RECEIVE-BUFFER CONTROLLER
58
58a
FRAME COUNTER
73
1-CYCLE DATA ACCUMULATOR
POINTER CORRECTION CONTROLLER
74
61
POINTER DETECTOR
2 HIGH-ORDER BYTES
PTR VALUE
PTR-DET
59
LATCH CIRCUIT
LATCHEN
12 BYTES
60
SELECTOR
RDPHASE
SPETOP
62
STS-3 FRAME ASSEMBLER

FIG. 30 PRIOR ART

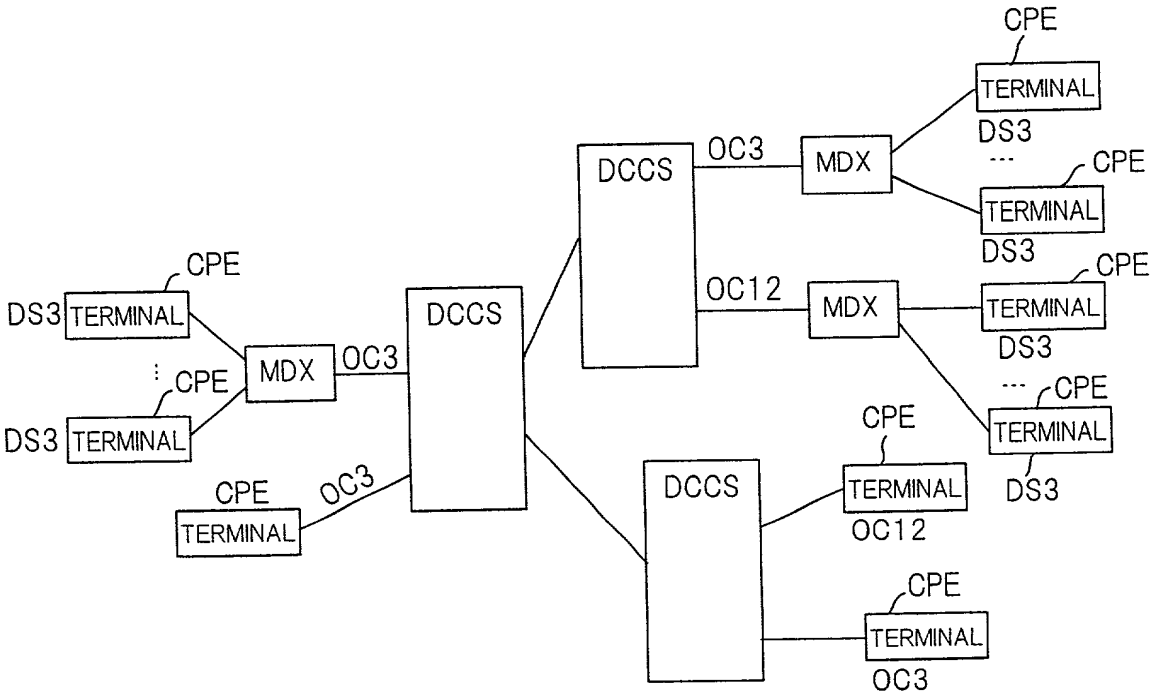
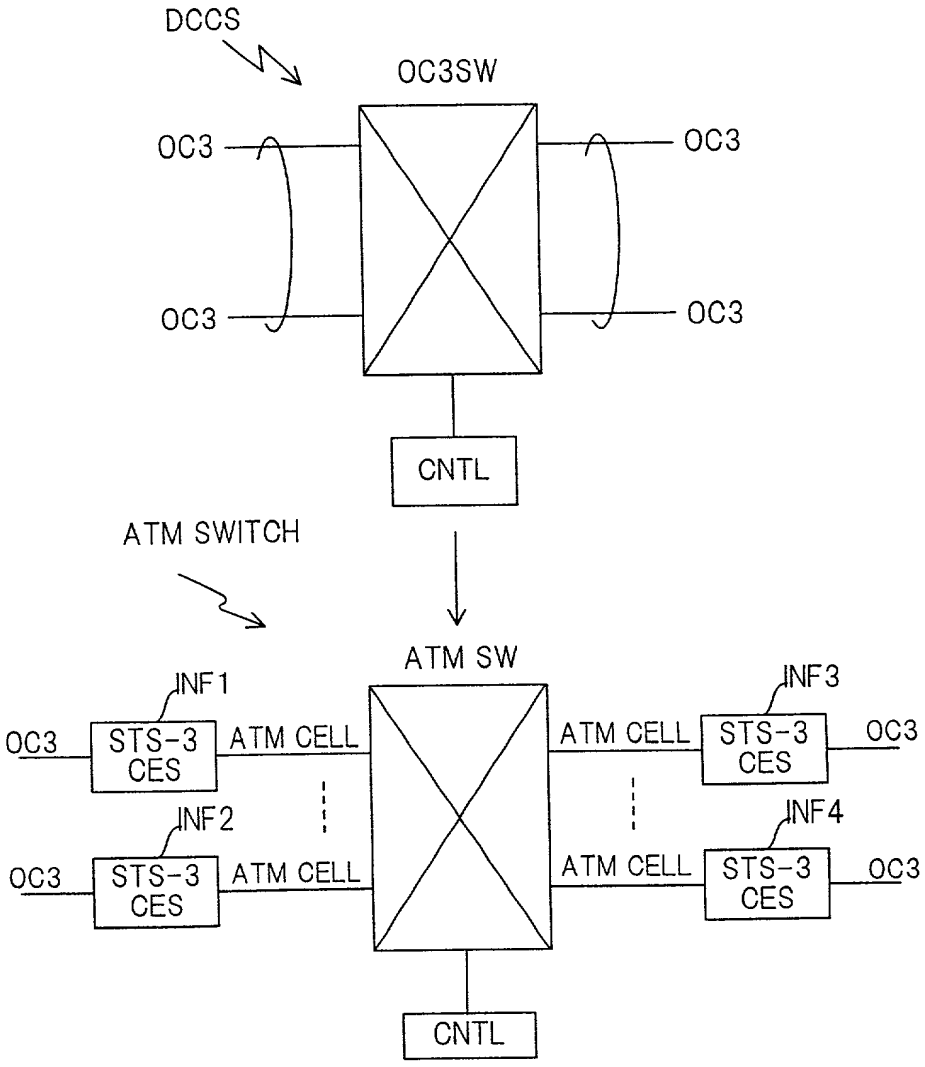



FIG. 31 PRIOR ART